

What is claimed is:

1. A WDM network system comprising:

an optical wavelength division multiplexed (WDM)  
5 transmission path;

a plurality of sub-networks each accommodating a  
client; and

a plurality of WDM nodes each corresponding to each  
of the plurality of sub-networks respectively and connected  
10 with the optical wavelength division multiplexed  
transmission path, wherein

each of the plurality of WDM nodes includes:

a wavelength converting unit for controlling  
oscillation frequencies in conformity with a destination  
15 address for which the communication destination is  
identified by an IP address; and

a cross-connecting unit for cross-connecting the  
route directed to an adjacent WDM node for connecting with  
the communication destination.

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2. The WDM network system according to claim 1, wherein

each of the WDM nodes includes a routing table for  
storing the IP address of the corresponding sub-network,  
a WDM node of an upper order of the sub-network, a  
25 cross-connection ID identifying the path, a wavelength  
used and information of the WDM node to which the main  
signal is first sent when reaching the target sub-network

using a predetermined path, and wherein

the control of the oscillation frequency by the wavelength converting unit and the cross-connecting of the route are conducted by referring to the routing table.

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3. The WDM network system according to claim 2, wherein

when an IP address of a sub-network in which a client is accommodated is notified from the client issuing a request for connection, the corresponding node registers

10 the IP address of the sub-network into the routing table,

and wherein

each WDM node exchanges the IP address information of the sub-network retained in the routing table with adjacent nodes.

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4. The WDM network system according to claim 1, wherein

the oscillation of wavelengths and the settings of cross-connection are started/ended and defined/erased in response to the occurrence/disappearance of traffic from  
20 the sub-network.

5. The WDM network system according to claim 1, wherein

the wavelength converting unit executes one-to-multiple communication by converting a wavelength  
25 into a plurality of wavelengths in response to a request for connection from one (1) client.

6. The WDM network system according to claim 2, wherein  
a plurality of selectable paths are set in a  
cross-connection ID identifying the path of the routing  
table, with the priority being registered for each path.

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7. The WDM network system according to claim 6, wherein  
the priority is set based on the quality of the WDM  
signal at the receiving terminal and can be updated in  
response to disconnection or recovery of the path.

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8. A WDM node, a plurality of which each corresponding  
to a plurality of sub-networks and connected to optical  
wavelength division multiplexed (WDM) transmission paths  
in a WDM network system for connecting the plurality of  
sub-networks each accommodating clients, through the  
optical wavelength division multiplexed transmission  
paths,

the WDM node comprising:

a wavelength converting unit for controlling an  
oscillation frequency in conformity with the destination  
address by which the communication destination is  
identified by an IP address; and

a cross-connecting unit for cross-connecting a route  
directed to an adjacent WDM node for connecting with the  
communication destination.

9. The WDM node according to claim 8, further comprising

a routing table for storing the IP address of the corresponding sub-network, a WDM node of an upper order of the sub-network, a cross-connection ID identifying the path, a wavelength used and information of the EDM node  
5 to which the main signal is first sent when reaching the target sub-network using a predetermined path, and wherein  
the control of the oscillation frequency by the wavelength converting unit and the cross-connecting of the route are conducted by referring to the routing table.

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10. The WDM node according to claim 9, wherein  
when an IP address of a sub-network in which a client is accommodated is notified from the client issuing a request for connection, the WDM node registers the IP  
15 address of the sub-net work into the routing table, and  
wherein

the WDM node exchanges the IP address information of the sub-network retained in the routing table with adjacent nodes.

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11. The WDM node according to claim 8, wherein  
the wavelength converting unit executes  
one-to-multiple communication by converting a wavelength into a plurality of wavelengths in response to a request  
25 for connection from one (1) client.

12. The WDM node according to claim 8, wherein

the oscillation of wavelengths and the settings of cross-connection are started/ended and defined/erased in response to the occurrence/disappearance of traffic from the sub-network.

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13. The WDM node according to claim 9, wherein

a plurality of selectable paths are set in a cross-connection ID-identifying the path of the routing table, with the priority being registered for each path.

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14. The WDM node according to claim 13, wherein

the priority is set based on the quality of the WDM signal at the receiving terminal and can be updated in response to disconnection or recovery of the path.

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